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EXAMINER

WARTALOWICZ, PAUL A

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |  |                                      |  |
|------------------------------|--|--------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/782,934   | <b>Applicant(s)</b><br>NOMURA ET AL. |  |
|                              | <b>Examiner</b><br>PAUL A. WARTALOWICZ | <b>Art Unit</b><br>1793              |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2 and 5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 1/9/08 have been fully considered but they are not persuasive.

Applicant argues that in the conditions of experiment D, the Bunsen reaction is not maintained because the short circuit current is negative.

However, claim 3 does not require that the Bunsen reaction is maintained for any specific period of time. One of ordinary skill reading Dokiya would understand that the reaction would take place from the reaction components present in experiment D. The short circuit may influence the direction or the extent of the reaction, but it is unclear how it demonstrates that a reaction other than a Bunsen reaction takes place in experiment D. The Bunsen reaction is described throughout the article and appears to be the reaction that takes place in the experiments.

Applicant argues that underneath Fig. 11, the experimental conditions (A-C) are performed for a molecular ratio  $\text{H}_2\text{O}/\text{H}_2\text{SO}_4 = 4.5$  which is larger than 4 and as such outside the claim range.

However, Fig. 11 is relied upon to show the reaction mechanism by which the starting components are reacted. This part of the recitation is not relied upon to show the relative molecular ratios.

Applicant argues that the experimental conditions A-D in Fig. 10 of Dokiya and the molecular ratios related to Fig. 11 of Dokiya do not meet the limitations recited in claim 5 and that none of the experiments A-D meets the limitations recited in claim 5.

However, Dokiya is not relied upon for the values of b nor c. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Both Mysels and Norman et al. teach ratios that read on the limitations of  $b < 8$  and  $c < 11$  (Mysels: col. 2) (Norman et al.: col. 3-4).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by Dokiya, et al. ("The Study of Thermochemical...").

Dokiya et al. teach a method for producing hydrogen (pg 139) wherein iodine and sulfur dioxide are reacted across a cation exchange membrane (pg 139-140) with a positive electrode layer and a negative electrode layer wherein the values of  $H_2O/H_2SO_4$  is 3.6 ( $aH_2O + H_2SO_4$  where  $a < 4$ , Fig. 11) and  $H_2O/HI$  is 5.3  $H_2O/I_2$  is 20 and ( $cH_2O + HI + bI_2$  where  $b < 8$  and  $c < 11$ , Fig. 11).

It appears that the prior art teaching meets the limitation of concentrating the second aqueous solution until the concentration of hydroiodic acid in it is higher than the pseudo-azeotropic composition, wherein the prior art teaches the respective molecular ratios as explained above.

It appears that the prior art teaching meets the limitation of concentrating the first aqueous solution until the concentration of sulfuric acid in it is higher than the value reported for the existing liquid-liquid separation method which is  $\text{H}_2\text{SO}_4$  to  $4\text{H}_2\text{O}$  in terms of molar ratio, wherein the prior art teaches the respective molecular ratios as explained above.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dokiya, et al. ("The Study of Thermochemical...") in view of either one of Mysels (U.S. 4176169) or Norman et al. (U.S. 4127644).

Dokiya et al. teach a method for producing hydrogen (pg 139) wherein iodine and sulfur dioxide are reacted across a cation exchange membrane (pg 139-140) with a positive electrode layer and a negative electrode layer wherein the values of  $H_2O/H_2SO_4$  is 3.6 ( $aH_2O + H_2SO_4$  where  $a < 4$ , Fig. 11)).

Dokiya et al. fail to teach  $H_2O/HI$  and  $H_2O/I_2$  such that  $b < 8$  and  $c < 11$ .

Mysels teach a method for the recovery of iodine (col. 1) wherein HI is present in an amount of between 40-70 wt% based upon HI plus  $H_2O$  for the purpose of providing a more efficient extractive distillation (col. 2).

Norman et al. teach a process for the production of hydrogen (col. 1) wherein the Bunsen reaction is carried out at a ratio of between 0.5-1.8 gram  $I_2$  for each gram of  $H_2O$  for the purpose of producing hydrogen polyiodides (col. 3-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide HI is present in an amount of between 40-70 wt% based upon HI plus  $H_2O$  or a ratio of between 0.5-1.8 gram  $I_2$  for each gram of  $H_2O$  in Dokiya et al. in order to provide a more efficient extractive distillation (col. 2) and produce hydrogen polyiodides (col. 3-4) as taught by Mysels and Norman et al., respectively.

It appears that the prior art teaching meets the limitation of concentrating the second aqueous solution until the concentration of hydroiodic acid in it is higher than the

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pseudo-azeotropic composition, wherein the prior art teaches the respective molecular ratios as explained above.

It appears that the prior art teaching meets the limitation of concentrating the first aqueous solution until the concentration of sulfuric acid in it is higher than the value reported for the existing liquid-liquid separation method which is  $\text{H}_2\text{SO}_4$  to  $4\text{H}_2\text{O}$  in terms of molar ratio, wherein the prior art teaches the respective molecular ratios as explained above.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz  
April 17, 2008

/Steven Bos/  
Primary Examiner  
A.U. 1793